

## **AMENDMENTS TO THE CLAIMS**

**This listing of claims will replace all prior versions and listings of claims in the application:**

### **LISTING OF CLAIMS:**

Claim 1 (cancelled): A material for a semiconductor-mounting heat dissipation substrate, the material being a copper-molybdenum rolled composite obtained by infiltrating and filling melted copper in a void or gap between powder particles of a molybdenum powder compact to produce a molybdenum-copper composite and rolling the molybdenum-copper composite, the rolled composite having a coefficient of linear expansion of  $8.3 \times 10^{-6}/K$  or less at 30-800°C in a final rolling direction in which a plate material is rolled.

Claim 2 (cancelled): A material for a semiconductor-mounting heat dissipation substrate as claimed in claim 1, wherein the rolled composite is a rolled product subjected to primary rolling in one direction at a temperature of 100-300°C and at a working rate of 50% or more and then subjected to secondary rolling as cold rolling in a direction intersecting with the one direction at a working rate of 50% or more, a total working rate being 60% or more, the coefficient of linear expansion in the secondary rolling direction at 30-800°C being  $7.2-8.3 \times 10^{-6}/K$ .

Claim 3 (cancelled): A material for a semiconductor-mounting heat dissipation substrate of a copper-clad type, comprising a copper/copper-molybdenum composite/copper clad material formed by press-bonding copper plates to both surfaces of a rolled composite, the rolled composite being the material for a semiconductor-mounting heat dissipation substrate of claim 1.

Claim 4 (cancelled): A material for a semiconductor-mounting heat dissipation substrate of a copper-clad type as claimed in claim 3, wherein the copper-molybdenum composite forming an intermediate layer has a coefficient of linear expansion of  $8.3 \times 10^{-6}/K$  or less at a temperature not higher than 400°C by controlling the ratio of copper and molybdenum and a draft rate, the material having a coefficient of linear expansion of  $9.0 \times 10^{-6}/K$  or less at a temperature not higher than 400°C.

Claim 5 (cancelled): A material for a semiconductor-mounting heat dissipation substrate of a copper-clad type as claimed in claim 3, wherein the copper-molybdenum composite forming an intermediate layer has a coefficient of linear expansion of  $8.3 \times 10^{-6}/K$  or less at a temperature of 30-800°C, the material having a coefficient of linear expansion of  $9.0 \times 10^{-6}/K$  or less at a temperature of 30-800°C.

Claim 6 (cancelled): A ceramic package comprising a heat dissipation substrate made of a material for a semiconductor-mounting heat dissipation substrate of a copper-clad type as claimed in claim 5.

Claim 7 (currently amended): A method of producing a material for a ~~semiconductor-mounting heat dissipation substrate~~, heat dissipation substrate for mounting a semiconductor chip, comprising:

press-forming molybdenum powder having an average particle size of 2-5 $\mu$ m at a pressure of 100-200 MPa to obtain a molybdenum powder compact,

impregnating melted copper into a void between powder particles of the molybdenum powder compact in a non[-]oxidizing atmosphere at 1200-1300°C to obtain a composite of molybdenum and copper which contains 70-60% molybdenum in weight ratio, the balance copper, and

rolling the composite at a working rate of at least 60% to produce a rolled composite, the rolled composite having a coefficient of linear expansion of  $8.3 \times 10^{-6}/K$  or less at [30-] 800°C which is matched with that of the semiconductor chip in a final rolling direction.

Claim 8 (currently amended): A method of producing a material for a semiconductor-mounting heat dissipation substrate as claimed in claim 7, wherein said step of rolling comprises the sub-steps of[:] primary rolling carried out in one direction at a temperature of 100-300°C and at a working rate of 50% or more, and secondary rolling carried out as cold rolling in a direction intersecting with the one direction at a working rate of 50% or more, a total working rate being ~~60%~~ 75% or more, thereby producing a rolled composite of molybdenum and copper which has a

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10/009,822

coefficient of linear expansion of  $7.2-8.3 \times 10^{-6}/K$  at [30-] 800°C in the secondary rolling direction.

Claim 9 (currently amended): A method of producing a material for a semiconductor-mounting heat dissipation substrate as claimed in claim 7, further comprising:

press-forming molybdenum powder having an average particle size of 2-5 $\mu$ m at a pressure of 100-200 MPa to obtain a molybdenum powder compact;

impregnating melted copper into a void between powder particles of the molybdenum powder compact in a nonoxidizing atmosphere at 1200-1300°C to obtain a composite of molybdenum and copper which contains 70-60% molybdenum in weight ratio, the balance copper;

rolling the composite at a working rate of at least 60% to produce a rolled composite, the rolled composite having a coefficient of linear expansion of  $8.3 \times 10^{-6}/K$  or less at 800°C which is matched with that of the semiconductor chip in a final rolling direction; and

press-bonding copper plates to both surfaces of the rolled composite to obtain a substrate for a semiconductor-mounting heat dissipation substrate having a copper-clad.

Claim 10 (currently amended) A method of producing a material for a semiconductor-mounting heat dissipation substrate as claimed in claim 9, wherein said step of rolling the copper-molybdenum composite as an intermediate layer is carried out with the ratio of copper and molybdenum and the reduction percentage controlled so that a resultant rolled composite has a coefficient of linear expansion equal to  $8.3 \times 10^{-6}/K$  or less at [a temperature not higher than] 400°C, and thereafter the step of press-bonding copper on both surfaces of the rolled composite is carried out to obtain a copper-clad rolled composite having a coefficient of linear expansion of  $9.0 \times 10^{-6}/K$  or less at a temperature not higher than 400°C.

Claim 11 (currently amended): A method of producing a material for a semiconductor-mounting heat dissipation substrate as claimed in claim 9, wherein said step of rolling the copper-molybdenum composite as an intermediate layer is carried out with the ratio of copper and molybdenum and the reduction percentage controlled so that a resultant rolled composite has

a coefficient of linear expansion of  $8.3 \times 10^{-6}/K$  or less at [a temperature of 30-]  $800^{\circ}C$ , and thereafter said step of press bonding copper on both surfaces of the copper-molybdenum composite is carried out to obtain a copper-clad rolled composite having a coefficient of linear expansion of  $9.0 \times 10^{-6}/K$  or less at ~~a temperature of 30-~~  $800^{\circ}C$ .

Claim 12 (currently amended): A method of producing a ceramic package, comprising ~~the steps of:~~

press-forming molybdenum powder having an average particle size of  $2-5\mu m$  at a pressure of 100-200 MPa to obtain a molybdenum powder compact, impregnating melted copper into a void between powder particles of the molybdenum powder compact in a non-oxidizing atmosphere at  $1200-1300^{\circ}C$  to obtain a copper-molybdenum composite containing 70-60% molybdenum in weight ratio, the balance copper, and rolling the composite at a working rate of at least 60% to produce a rolled composite having a coefficient of linear expansion of  $8.3 \times 10^{-6}/K$  or less at [30-]  $800^{\circ}C$  in a final rolling direction;

press-bonding copper plates to both surfaces of the rolled composite to obtain a copper-clad rolled composite having a coefficient of linear expansion of  $9.0 \times 10^{-6}/K$  or less at a ~~temperature of 30-~~  $800^{\circ}C$ ; and

directly brazing the copper-clad rolled composite with ceramic having a metal layer affixed to a surface of the ceramic.

Claim 13 (cancelled): A rolled composite formed by impregnating copper into a void between powder particles of molybdenum powder compact and rolling said powder compact, wherein the coefficient of linear expansion of the rolled composite is defined by the direction of final rolling in the rolling process and is equal to  $8.3 \times 10^{-6}/K$  or less in a temperature range of  $30-800^{\circ}C$ .

Claim 14 (cancelled): A rolled composite as claimed in claim 13, wherein the coefficient of linear expansion is  $7.2-8.3 \times 10^{-6}/K$  in a temperature range of  $30-800^{\circ}C$ .